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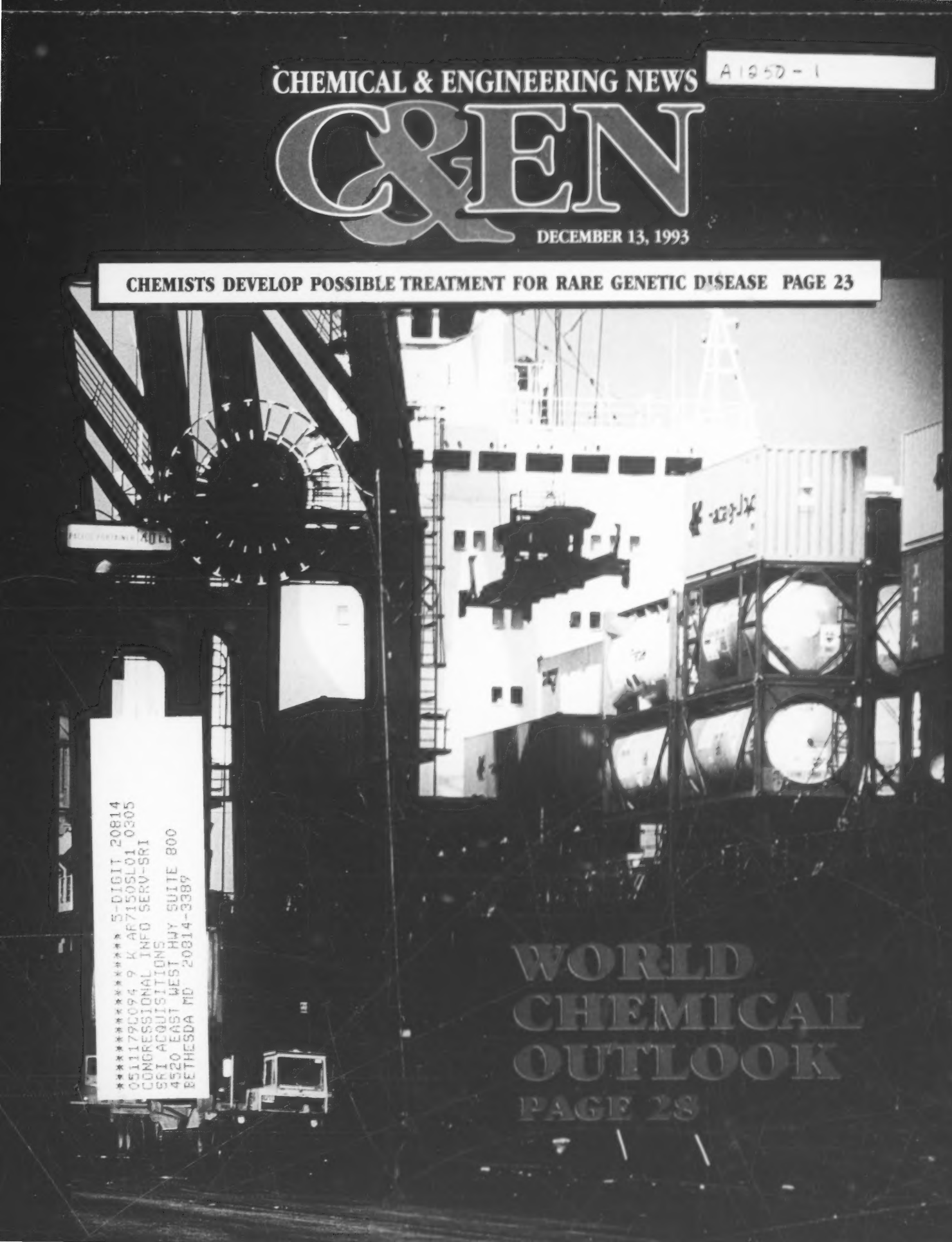
CHEMICAL & ENGINEERING NEWS

C&EN

DECEMBER 13, 1993

CHEMISTS DEVELOP POSSIBLE TREATMENT FOR RARE GENETIC DISEASE PAGE 23



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WORLD CHEMICAL OUTLOOK

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CHEMICAL & ENGINEERING NEWS

C&EN

DECEMBER 13, 1993

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- Japanese research group develops a new synthetic technique for adding aromatic ketones to alkenes in a single step. **Page 6**
- Sen. Tom Harkin promotes proposal to set aside and guarantee increases in biomedical research funding at NIH as built-in feature of health care reform. **Page 7**
- ACS Board of Directors reelects chairman Paul Walter, approves 1994 operating budget, makes plans for 1994. **Page 7**
- Federal Trade Commission orders ICI to sell one of three U.S. acrylic plants by May 1995. **Page 8**
- British research group reports findings "decisively" contradicting controversial claims of "water memory" published in 1988 by team led by French pharmacologist. **Page 8**
- Energy Department and the three major auto companies sign an R&D agreement to expedite joint efforts to produce a new generation of cars with greater fuel efficiency and far lower emissions. **Page 9**

COVER: Port of Houston. Photo by PICTOR/Uniphoto Picture Agency

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BUSINESS

As sluggish markets hurt growth of specialty chemicals maker ISP, president Thomas Bohrer attempts to return the company to higher profits by expanding product line. **Page 13**

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Research, particularly that of the civilian sector, fared relatively well in the fiscal 1994 federal budget approved by Congress; total research funding is $65 billion. **Page 19**

Defense Department is offering to accept halons that will be banned Jan. 1, to prevent some owners of the materials from venting the chemicals rather than pay a new tax. **Page 20**

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"A Hand Up: Women Mentoring Women in Science" includes interviews with successful women scientists, advice to women beginning careers, and potential resources. **Page 49**

WORLD CHEMICAL OUTLOOK

Chemical industries around the globe still are struggling to recover from the recession that has gripped many nations' economies, although most look for at least a modest upturn in 1994. **Page 28**

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LETTERS

CHEMICAL SAFETY

Azide explosions discussed

There is every reason to suppose that eschewing halogenated solvents will not eliminate azide explosions such as those reported by N. P. Peat and P. M. Weintraub (C&EN, April 19, page 4) and by Victor J. Hruby, Lakmal Boteju, and Guigen Li (C&EN, Oct. 11, page 2). The first group explicitly combined sodium azide and sulfuric acid, generating hydrogen azide, which is very explosive. The second group's report was less explicit, but the cold traps of the vacuum pump of the rotary evaporator were involved, implying an explosive more volatile than dichloromethane.

Hydrogen azide (boiling point 37 °C) fits this description. The boiling point of diazidomethane may be known, but not to me; I should expect it to be at least 90 °C. This means explosions late in solvent stripping, either in the evaporating flask or in the condenser. On the evidence offered your readers, there is no reason to postulate the complicated reaction leading to diazidomethane, even though it can occur in other circumstances.

Hydrogen azide is also, of course, extremely toxic, and it is a rare explosion that consumes all the explosive, rather than spraying it around.

Peter G. Urben
Editor, "Bretherick's Handbook of Reactive Chemical Hazards"
Kenilworth, Warwickshire, England

Ball mill reactor

The article "Novel Idea Developed To Destroy Toxic Chemicals," by Stu Borman, was very interesting (C&EN, Oct. 11, page 5). The mechanochemical technique, or ball milling technology, to carry out stubborn chemical reactions is unique but scarcely novel. I was highly pleased to note that others have also recognized the potential application of the lowly ball mill for this purpose.

Back in 1958–59, while working in the R&D division of Ethyl Corp. in Baton Rouge, La., I discovered that a ball mill was a very effective reactor to make difficult reactions go to completion with high yields. This was demonstrated by combinations of solid-solid, solid-gas, and liquid-gas reactants. Our ball mill design was unique. It could be heated or cooled and was designed with hollow trunions with pressure seals to safely feed and discharge reactants and products that were either hazardous or sensitive to air or moisture exposure.

Our ball mill design was furnished to a ball mill manufacturer, who advertised it as a "mill reactor." Details of the research and development of the ball mill reactor were later described in a technical paper [*I&EC Product Research & Development*, 2(3), 238 (1963)]. Copies of this paper, "Preparation of Sodium Alpha-Sodioalkanoates by the Reaction of Sodium Alkanoates with Sodium Metal," have been widely distributed.

George W. Mattson
Emeritus member
Santee, Calif.

The idea of ball milling toxic chemicals is one of those "Now, why didn't I think of that" things. I don't see any reason to doubt that the Aussies have accomplished what they say they have, even if they haven't told all. It opens up the possibility that other mechanical devices could be used, for example, crushers, grinders, milling machines, rollers, and stamp mills; although the ball mill certainly has the advantage of simplicity and complete con-

Notice to members wishing to resign

ACS members who wish to resign their membership at the end of 1993 should do so now by letter to the ACS executive director. Bylaws specify that anyone who fails to resign by Dec. 31 will be carried on the rolls in 1994 as a member and will be responsible for dues. Failure to pay dues does not constitute a resignation.

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to convert defense technologies to civilian applications. The idea is to cut federal red tape from government purchases of new technology from industry. The current process is cumbersome and expensive and discourages companies from wanting to develop innovative technologies. The council is likely also to rate that process in its next scorecard.

Another category Fisher mentions is the government's role in remaking the country's technological infrastructure—from bridges and roads to information systems. With regard to what role the technology community can play in improving the country's social infrastructural problems—bad schools, broken families, children lost to crime—Fisher says the problems are tough but important. Focusing mainly on the impact of the information revolution on society, Fisher says he is worried that the poor will be left out.

Wil Lepkowski

Civilian spending up in 1994 R&D budget

Putting the final touches on the fiscal 1994 federal budget was one of the last items of business Congress completed before adjouring for the year. Overall research fared quite well, particularly civilian sector research.

According to the Office of Management & Budget, Congress approved 82% of the new research investments sought by President Clinton as part of his economic revitalization plan. In line with that plan Congress provided increased resources for information highways, energy research, National Aeronautics & Space Administration (NASA) research and development, National Science Foundation (NSF) research, National Oceanic & Atmospheric Administration (NOAA) weather technology, National Institute of Standards & Technology (NIST) programs, and multiagency research programs organized by the Federal Coordinating Council on Science, Engineering & Technology.

The last two fiscal 1994 appropriations bills to be signed into law provided research funding totaling $36 billion for the Department of Defense and Department of Interior, plus parts of the Agriculture and Energy departments. Adding that figure to research funds previously appropriated (C&EN, Oct. 25, page 20) brings total research funding for fiscal 1994 to $65 billion, 2% less than what was spent in 1993 and 5% less than the Administration wanted.

All of the decline can be accounted for by the 8% fall to $36 billion in funding for DOD and DOE defense research programs. Funding for civilian R&D is actually up 7% to $29 billion, almost exactly what the Administration requested.

The decline in DOD's research funding didn't lead to a concomitant decline in earmarks for specific projects. According to Rep. George E. Brown Jr. (D.-Calif.), while "a complete analysis of the Defense appropriation bill [H.R. 3116] will take weeks of work, a quick analysis indicates that there are probably several billion dollars in earmarks folded into the bill and accompanying reports." In a few short hours, his staff found apparent set-asides accounting for 3% of the Air Force's total research budget, 6% of the Army's, 5% of the Navy's, and 9% of the research budget for the defense agencies.

Brown admits that not all of these may be earmarks in the accepted sense of the word. They certainly are, however, "items of special Congressional interest." Essentially, Brown says this "means that any desire by DOD or the services to spend those monies in any other way or to spend less than the designated amount requires the prior approval of the appropriators."

In the Senate, Sen. John McCain (R.-Ariz.), who believes that earmarks are seriously harming military effectiveness, warned that if next year he does not have enough time to find and try to delete earmarks from the appropriation, he will object to consideration of the conference report. That could stall the bill's passage for some time.

No sooner had Congress settled the fiscal 1994 research budget, earmarks and all, than the House, prompted by the Administration, started whittling it down. In its reinventing government proposals (C&EN, Oct. 11, page 20) the Administration proposed cutting some $2 billion from the 1994 federal budget, including the research budget.

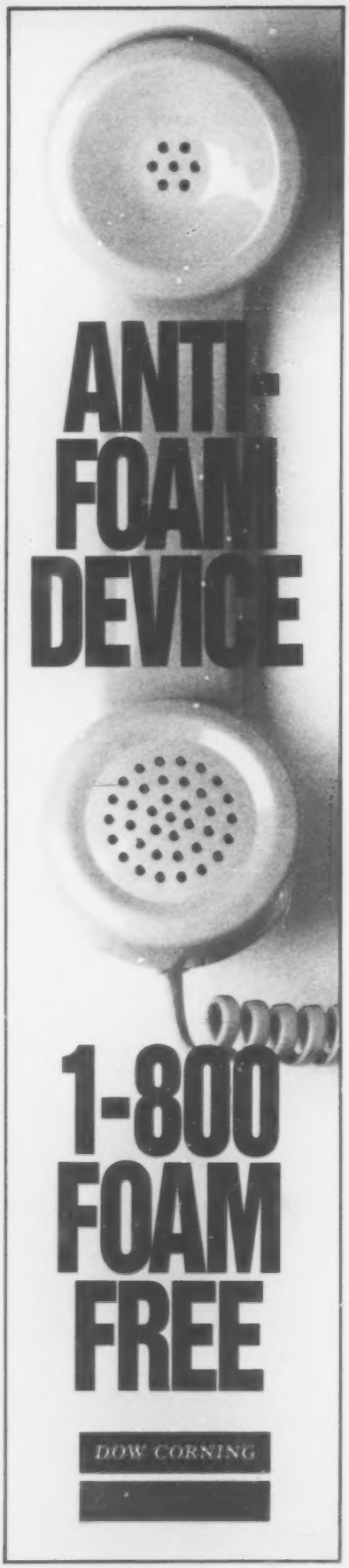
For example, it proposed cutting $25 million from the Agricultural Research Service's $725 million budget and $64 million from the Cooperative State Research Service's $511 million budget. The House rejected the ARS cut and limited the CSRS cut to $14 million. It went along with the proposed total cut of $97.3 million from the Department of Energy's $4 billion energy supply R&D account and made some cuts that the Administration hadn't sought. These include $25 million from NASA's $2 billion R&D account and $10 million from the $100 million provided for NSF's academic research infrastructure revitalization program.

Things could have been worse. Before approving the Administration's reinventing government plan, H.R. 3400, the House rejected an amendment put forward by Rep. John R. Kasich (R.-Ohio) and Rep. Timothy J. Penny (D./Farmer/Labor-Minn.) that not only would have cut substantially more from the 1994 research budget, but would have totally reorganized the federal research establishment.

Congress cuts '94 defense research funds 8%

$ Millions	1994 Appropriation	1994 Request	1993	% difference Appropriation/request	% change 1993–94
DOD R&D	$34,947	$38,336	$37,962	–9%	–8%
Air Force	12,314	13,695	13,199	–10	–7
Defense agencies	8,839	10,175	9,800	–13	–10
Navy	8,366	9,216	8,930	–9	–6
Army	5,428	5,250	6,033	3	–10
Energy	828	818	723	1	14
Fossil R&D	431	398	418	8	3
Conservation R&D	397	420	305	–6	30
USDA forest research	193	194	183	–1	6
Interior—National Biological Survey research	83	83	87	–1	–4
TOTAL	$36,051	$39,431	$38,955	–9%	–8%

Source: Congressional reports on fiscal 1994 appropriation bills



CIRCLE 6 ON READER SERVICE CARD

Their amendment called for creation of a new Department of Science, Space, Energy & Technology encompassing DOE, NASA, NIST, NOAA, NSF, the National Technical Information Service, the Patent & Trademark Office, the Office of Science & Technology Policy, and the technology programs of the Department of Commerce. In addition, the amendment called for cutting $220 million in 1994 from federal academic R&D programs sponsored by DOD, NIH, and NSF and for sharp cuts in DOE's fossil and fusion research accounts, plus termination of the clean-coal technology program.

The Senate won't take up the reinventing government package until after Congress reconvenes in late January, and there's no guarantee that a proposal similar to the one by Penny-Kasich won't surface then.

Money wasn't the only item on the agenda as Congress closed down its first session amid a flurry of activity, but not many items made it through both branches of Congress. One bill that did was H.R. 3216, introduced Oct. 5, which closes a loophole in the Chemical Diversion Control Act.

Currently, manufacturers of over-the-counter drugs approved for sale by the Food & Drug Administration do not have to report sales to the Drug Enforcement Administration (DEA). However, clandestine laboratory operators have been obtaining large quantities of 25-mg ephedrine tablets for use in making two powerful stimulants, methamphetamine and methcathinone. The latter is posing a particular problem in Michigan's Upper Peninsula, according to the bill's sponsor, Rep. Bart Stupak (D.-Mich.), who represents the area. The bill removes the exemption for ephedrine, requiring record keeping and reporting of sales of drugs in which it is the only active ingredient. The bill also grants DEA the authority to remove the exemption from any other chemicals used in the illicit production of controlled substances.

The House approved legislation, H.R. 1994, providing the first formal authorization for Environmental Protection Agency research programs since 1982. The bill would require EPA to set up a fundamental program in support of ecological, health, and risk-reduction research; establish a program for modernizing and upgrading its research facilities and equipment; and focus its research program on the 10 environmental hazards that pose the greatest risk to human health and the environment. The House also approved H.R. 3512, a bill that would abolish the Council on Environmental Quality and replace it with a White House Office of National Environmental Policy Act Compliance. The Senate will be taking up both issues next year.

Janice Long

Defense Department to accept unwanted halons

Afraid that some owners of halons will vent the ozone-depleting chemicals to the atmosphere rather than pay a stiff new tax that soon goes into effect, the Department of Defense has cut through red tape and is offering to immediately accept unwanted material. A private firm, BP Exploration Alaska, is making a similar offer.

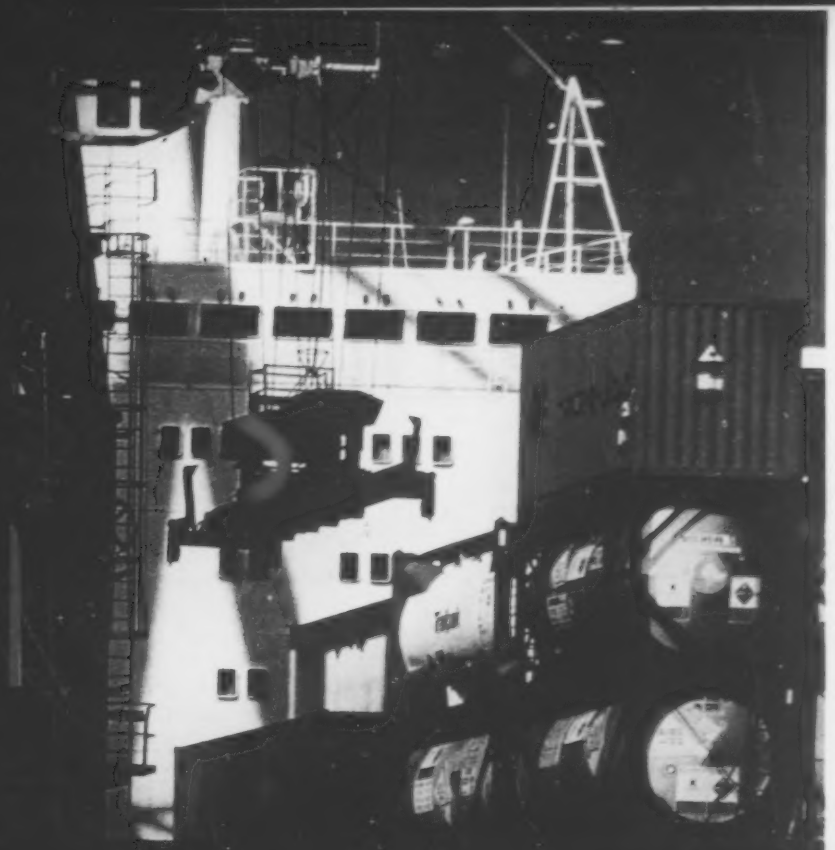
Production and import of halons—brominated fluorocarbons used to fight fires—will be banned as of Jan. 1 under the Montreal Protocol on Substances That Deplete the Ozone Layer and the U.S. Clean Air Act. In actuality, demand has dropped; no one has been making the chemicals for months. The current supply, most of which is "banked" in existing fire-suppression systems, is expected to last for decades now that unnecessary emissions such as those from discharge testing have been curtailed.

Also on Jan. 1, manufacturers and distributors of pure halons will be subject to a tax of $43.50 per lb on their unsold inventories. (Halons currently cost about $6.00 or $7.00 per lb.) The tax applies only to halon owners holding the chemicals for sale on that date, not to end users who have halons in their equipment. Used and recycled halons are not subject to the tax.

Some environmental organizations have been concerned that halon owners might release the chemicals into the air rather than get stuck with the tax. Many such owners are small "mom-and-pop" distributor operations that maintain and refill extinguishers for local businesses.

"We've heard estimates that there are 500,000 to 1 million lb of halons sitting in storage at distributors," says Dave Kolar, president of Navesink Environmental Testing in Red Bank, N.J., and chairman of the Sierra Club's ozone depletion working group. "Small businesses are facing a tax that could potentially bankrupt them versus venting, which they may not get caught at."

WORLD CHEMICAL



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OUTLOOK

As 1993 draws to a close, it is apparent that the world chemical industry has a long way to go to get back to the health it enjoyed in the late 1980s.

If the world's countries were in a hospital, they would be in a variety of conditions. The U.S. and Canada would be in the recovery room, perhaps in guarded condition. However, most of Europe would be in serious condition and Japan would be in intensive care.

The U.S. chemical industry, having cut costs over the past couple of years, is showing signs of improvement, not only in demand, but also in terms of financial health. Its recovery so far is fragile, but if general economic trends that have appeared in the second half of this year continue, the industry likely will be in decent shape by mid-1994.

The one continuing problem in the U.S. is trade. Weak economies elsewhere in the world have slowed exports from the U.S. and have shrunk the traditional U.S. chemical trade surplus. But, predictions are for export growth next year, and this, along with increased domestic demand, likely will provide higher operating rates and profits for the U.S. chemical industry.

Canada, after some severe bloodletting in terms of employees and plants, is following closely behind the U.S. in recovery, and, helped next year by improving exports, probably will be well on the mend.

In Europe, however, the chemical industry is being hurt considerably by industry overcapacity and high social costs. Plans are evolving to cut capacity, especially in petrochemicals, and the high overheads may be reduced in some countries such as Italy, as it privatizes its chemical industry. But most European chemical companies still see little hope in 1994.

The chemical industry in Japan is taking drastic measures for that country to prevent the already bad state of chemicals from getting worse.

And all over the world, chemical companies continue to realign their product portfolios, shucking off businesses that don't fit into their plans, buying businesses that they believe will fit well with existing operations, and getting rid of the fat in hopes of finding robust health once again.

UNITED STATES

Chemical Industry Lackluster This Year

1994, however, looks to be much better in earnings and profit margins if upturn continues to build

William J. Storck,
C&EN Northeast News Bureau

Prospects for the U.S. chemical industry are looking up. After continuing declines in industry fundamentals through 1992 and into the first part of 1993, chemicals are beginning to perform better. And the outlook for 1994 seems to be more of the same.

Although about the best that could be said for this year is that it will be better than 1992 in terms of sales, profits, and profitability, it may well mark the turning point for many chemical companies from the long slide of the past few years.

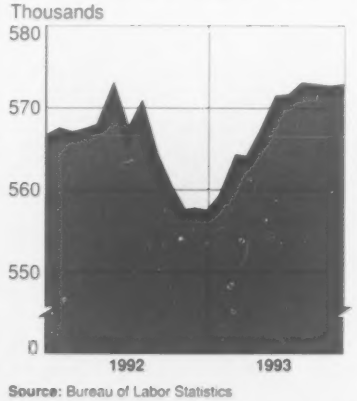
The reason for the optimism is not so much that all of 1993 has been good, but that there has been a pickup in the past few months in major downstream markets such as automobiles and housing. Also, the U.S. chemical industry has spent the past couple of years cutting costs in terms of employment and processes. The result, in spite of struggling economies in other parts of the world, should be continued expansion next year.

This year started out the same as the past few. During the first quarter, as a group the 30 major chemical companies regularly surveyed by C&EN continued to post lower year-to-year earnings, as they had for the previous 14 quarters. However, by the second quarter, many of these same chemical companies were posting earnings increases big enough to produce the first annual growth in total quarterly earnings of this group since the second quarter of 1989.

Thus, 1993 probably will show an increase over 1992 in earnings from continuing operations, excluding extraordinary and nonrecurring items—probably the best measure of industry health.

This year has really not been all that bad for growth in the chemical industry. During the first nine months of 1993, shipments of chemicals and allied products totaled about $237 billion, according to the Commerce Department, an increase of 4.1% over the same period in 1992. And shipments of industrial chemicals during the same period rose 3.4% to $122 billion.

Number of chemical production workers rises



Source: Bureau of Labor Statistics

The Society of the Plastics Industry reports that for the first three quarters, total resin shipments increased 4.1% to almost 46.3 billion lb and during September, resin shipments were up more than 9% to 5.3 billion lb.

Synthetic fiber shipments have not performed as well as plastics, however, but through the first nine months, shipments of noncellulosic fibers increased 2.4% to 6.6 billion lb.

The increase in chemical shipments this year has been supported by a rise in production. The average industrial production index for chemicals and allied products through the first nine months was 118.0 (1987 = 100), 3.2% higher than for the same period last year.

The laggard in the economic picture has been chemical prices, which during the first nine months of this year were up just 2.2% over the same period of 1992 to an average producer price index of 128.2 (1982 = 100).

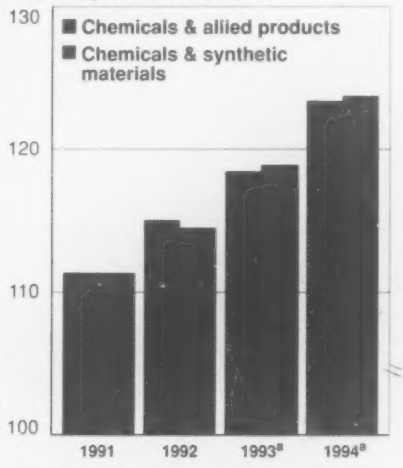
Thus, the outlook for the remainder of this year is pretty good, enabling the chemical industry to finish 1993 with a better record than it achieved in 1992. U.S. chemical shipments for the year will probably fall somewhere between $312 billion and $314 billion, with the high side looking fairly probable. Shipments of industrial chemicals, which totaled $156 billion in 1992, likely will amount to almost $162 billion for this year.

Production also will maintain its growth for the remainder of the year, with chemicals and allied products finishing at an average index of 118.4, up from 115.0 in 1992. And output of industrial organics, inorganics, and synthetic materials will grow from a 1992 index of 115.5 to an index of 118.9 this year.

But the price index for chemicals and allied products will probably finish the year with no better growth than 2%, while that for industrial chemicals will be up an even lower 1.1%.

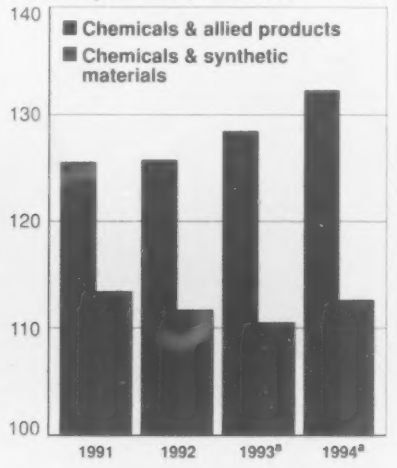
In terms of the general economy, the outlook for the fourth quarter of this year and into next seems to be brighter. Economists have been speaking once again of "pentup demand" for high-end products such as automobiles and housing, and

Chemical production will continue to rise . . .



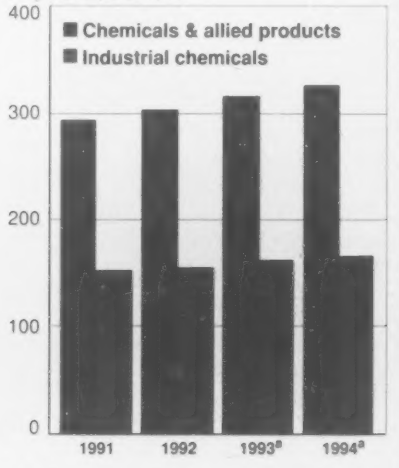
a C&EN estimates. **Source:** Federal Reserve Board

. . . and prices will rise some in 1994 . . .



a C&EN estimates. **Source:** Bureau of Labor Statistics

. . . as demand increases moderately



a C&EN estimates. **Source:** Bureau of the Census

they believe that consumers, spurred by low interest rates, are beginning to buy these items. Pentup demand is economic jargon for what people want to buy during a recession, but can't afford.

Two of these downstream markets—automobiles and housing, which use large quantities of chemical products—seem to be poised for a decided upturn as consumers turn loose their cash.

Housing, which has been in the doldrums for a few years, especially seems to be on the verge of sustained improvement, brought on by the combination of pentup demand and low interest rates. New home sales in September and October combined showed a healthy 10% rise from the same two months in 1992.

In plastics, new housing construction seems to be having an effect on the normally lackluster sales of thermosetting resins, many of which are used in construction materials. For instance, while total sales and captive use for all plastic resins were up 4.1% for the first three quarters of 1993, thermosetting resins grew 8.5%. And in September, in spite of a much improved 9.1% growth for all resins, thermosets still led the way with an 11% increase. Sales of melamine resins, some of which go to the construction industry, registered a phenomenal 75% gain for the first three quarters; however, this is on small volume. The much larger volume urea resins are more typical, with a 13% increase in the first nine months.

Fibers also show the effects of new construction (where the builder usually installs carpet) and sales of existing homes (where purchasers often replace carpet after they buy). While total synthetic fiber shipments increased 2.4% in the first nine months, shipments of yarn and monofilament rose 4.0%. And almost all of this growth was provided by carpet nylon, up 8.1% from the same period in 1992.

In another major chemical market, fertilizers are also expected to get a boost in demand in 1994, as farmers increase acreage planted to make up for crops lost in the 1993 flooding in the Midwest. However, fertilizer producers also must contend with extremely low pricing. The Department of Agriculture predicts that supply and demand will be in balance next year, so whether fertilizer producers can improve their lot by raising prices remains to be seen.

Despite the headlines about declining chemical employment, the outlook for 1994 is good for production workers. Although employment has declined and will continue to do so as companies restructure their operations, most of the cuts have come in the white-collar segment of management, sales, and support. The numbers of chemical production workers actually are increasing and have been since early in 1993. Total production workers for chemicals and allied products had declined from 606,000 at the end of 1989 to 557,000 by January of this year, but by November 1993 chemical producers had added 15,700 more.

And this growth in production workers comes while the chemical workweek for most of the year has remained above a very healthy 43 hours, indicating that, barring some dramatic downturn, which economists are not predicting, chemical production will continue to grow well into 1994.

Oddly, much of the increase in production workers has come in the highly cyclical industrial chemicals and synthetics segments. Producers in these areas added 9,000 workers between January and October (November 1993 data are not yet available for this group) and added 13,500 since the 1992–93 low of 231,800 production workers in December last year.

This carryover of these good industry fundamentals bodes well for the fortunes of the chemical industry next year, although most analysts seem to be wary in their predictions. For instance, a survey by the Chemical Manufacturers Association of its members indicates a growth in sales next year of about 5% and growth in income of about 10%.

This forecast is probably about as good as any, although the earnings prediction may well be on the slightly conservative side. Chemical producers have lowered their costs and thus their break-even points so that each 1% increase in sales probably will garner more than a 2% increase in earnings. □

FOREIGN TRADE

Earl V. Anderson,
C&EN Northeast News Bureau

U.S. Chemical Trade Surplus Declines

Surplus will shrink to $15.7 billion as weak economies overseas keep export growth low; rebound forecast for 1994

In the past two years, the economies of the world's major industrialized nations have flip-flopped. The result hasn't helped U.S. chemical trade performance. The chemical industry's prized trade surplus—the excess of chemical exports over imports—has slipped for the second year in a row.

In 1991, the U.S. was mired in recession while the economies of other industrialized countries were holding up fairly well by comparison. With a lid on domestic markets and more capacity available to produce for foreign markets, U.S. chemical companies pushed their exports ahead by more than 10%. And with low demand in the U.S., chemical imports advanced only 7.6%, and the U.S. chemical trade surplus leaped to a record $18.8 billion.

Since then, the U.S. economy has been recovering, albeit slowly. Meanwhile, the economies of other industrialized nations, particularly Japan and European countries, became bogged in recession.

This reversal has taken its toll on U.S. chemical trade. Faced with stagnant markets in many countries, U.S. chemical exports advanced only 2.3% last year and probably will grow only 2.1% this year to $44.9 billion. That's a new record.

Chemical imports, however, are growing faster. They increased 14.5% last year and likely will advance 5.5% this year—more than twice as fast as exports. That will push the 1993 chemical import total up to $29.2 billion, also a new record.

The increase in chemical imports will also lower the U.S. chemical trade surplus to $15.7 billion, from $16.3 billion in 1992. That's the lowest it's been since 1989.

A recent survey by the Chemical Manufacturers Association (CMA) indicates that its member companies expect chemical exports to bounce back next year with a 5% growth. However, CMA members expect little change in imports next year. The consensus: an increase of only 1%.

If those survey results are right, U.S. chemical exports in 1994 will reach a record $47.1 billion, while imports inch up to $29.5 billion. That would reverse the two-year slump in the chemical trade balance and push it back up to $17.7 billion, second only to the record $18.8 billion in 1991.

Those survey results may turn out to be overly optimistic. According to CMA, its large-company members—those with sales of more than $1 billion—think that next year's chemical exports will increase only 2.8%, not the consensus 5%. CMA notes that for this year, its members also predicted that exports would increase 5%, instead of the 2.1% actual figure.

All U.S. chemical exports except fertilizers are up this year

	U.S. chemical exports				U.S. chemical imports			
$ Millions	1993[a]	1992	1991	1990	1993[a]	1992	1991	1990
Organic chemicals	$11,045	$10,993	$10,928	$10,400	$ 9,344	$ 9,366	$ 8,157	$ 7,392
Plastics in primary form	7,319	7,178	7,537	6,428	2,716	2,247	1,930	1,974
Medicinals & pharmaceuticals	5,747	5,357	4,606	4,103	4,146	3,812	3,053	2,500
Inorganic chemicals	4,131	4,119	4,102	3,816	3,241	3,300	3,299	3,234
Plastics in nonprimary form	3,278	3,076	2,786	2,633	2,132	2,046	1,855	1,774
Essential oils, perfumes, toilet & cleansing preparations	2,963	2,631	2,361	1,963	1,752	1,711	1,417	1,323
Dyeing, tanning & coloring materials	1,976	1,867	1,648	1,588	1,723	1,681	1,416	1,288
Fertilizers	1,751	2,372	2,980	2,574	1,168	952	919	955
Other	6,690	6,363	6,019	5,478	2,978	2,569	2,123	2,028
TOTAL	**$44,900**	**$43,956**	**$42,967**	**$38,983**	**$29,200**	**$27,684**	**$24,169**	**$22,468**

a C&EN estimates. **Source:** Bureau of the Census

CMA also says that companies represented in the survey aren't "accurate predictors" of import growth. Unless some of the major overseas economies start a solid recovery, it's reasonable to expect that chemical imports will advance faster than exports in 1994.

One thing hurting the U.S. chemical industry's trade performance this year is that exports of the "big dollar" chemical categories, such as organics and synthetic resins, are showing relatively low growth. The larger growth rates are generally confined to smaller categories that don't contribute as much to the export totals. This trend has become apparent over the past few years, and is likely to continue.

For instance, organic chemicals are the largest single chemical export category, accounting for 25% of total chemical exports last year. But in 1988, organics' share of chemical exports exceeded 30%.

That share has been declining steadily ever since. This year, it probably will drop even further, because exports of organic chemicals are expected to increase only 0.5% to just over $11 billion.

Among the largest chemical export categories, only medicinals and pharmaceuticals are faring well this year. Exports of these materials will probably increase 7.3% to $5.7 billion.

Meanwhile, exports of such specialty chemicals as dyes and coloring materials, essential oils, perfumes, toilet preparations, and cleaning materials are growing faster than the all-chemical average in 1993. Exports of dyes and coloring materials, for instance, will increase 5.8% to almost $2 billion. But product categories such as these represent only a small percentage of the total export pie.

Behind this less than stellar performance of total chemical exports are weak economies in some major overseas markets. The European Community (EC) is a good example. Last month, EC commissioner Henning Christophersen revised forecasts made only this past summer. What they show is no surprise. Starting in summer 1992, the economies in most EC countries deteriorated sharply and have yet to recover. Gross domestic product (GDP) will be down 0.4% this year, on average.

Most economic indicators still are hovering at historically low levels, which to Christophersen suggests sluggish economic activity for the next few months. However, he believes that the economic slump may be leveling off and that the EC may have seen the trough of the recession. He sees a chance for a moderate economic recovery next year.

Even that small increase will come too late to help this year's U.S. chemical exports to the EC. As a bloc, the EC is the U.S. chemical industry's largest single market. Last year, 27% of U.S. chemical exports found markets in EC countries.

This year, however, U.S. chemical exports to the EC will drop 7.6% to about $11.1 billion. EC's share of the total will slip below 25%.

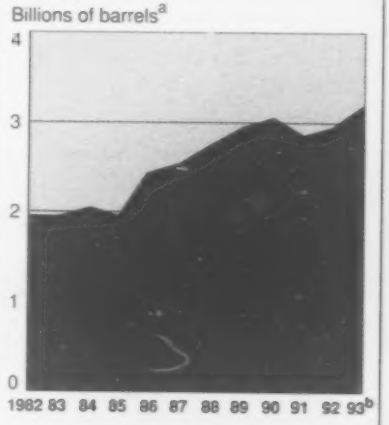
On a percentage basis, the largest decrease in chemical exports will be in exports to communist Asian countries, nearly all to China. At $735 million, these exports will be 39% lower than they were last year.

Chemical exports to other, booming markets of Asia, such as Malaysia and Thailand, aren't growing as fast as they have been. Several Asian countries are starting to supply at least part of their own markets from their own chemical plants. And even the high-flying Asian economies are starting to cool down a little.

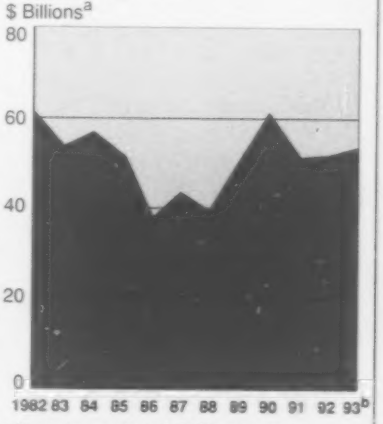
As a result, U.S. chemical exports to Asia, which advanced 9.2% in 1991, slipped 1.6% last year and likely will increase only 2.6% this year. Still, that adds up to a hefty $7.2 billion.

Canada is the brightest spot in the U.S. chemical trade picture. Chemical exports to Canada, facing little or no tariffs as a result of the U.S.-Canada Free Trade Agreement, will jump 12% in 1993 to $8.2 billion. That's good news for U.S.

U.S. oil imports will rise this year . . .

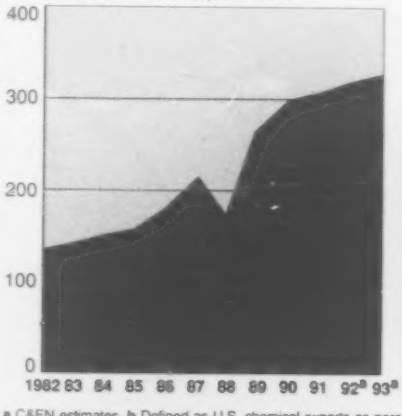


. . . pushing up the cost of oil imports

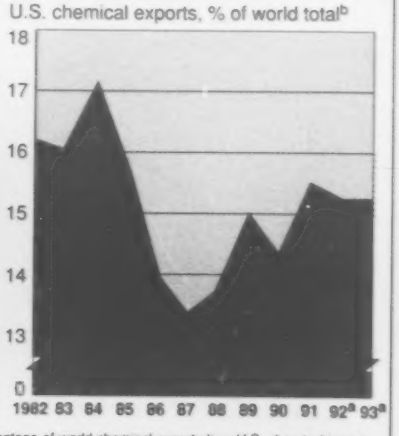


a All petroleum products. b C&EN estimates.
Source: Bureau of the Census

World chemical exports manage slight gain . . .



. . . as U.S. market share stands pat this year



a C&EN estimates. b Defined as U.S. chemical exports as percentage of world chemical exports less U.S. chemical imports.
Sources: United Nations, Organization for Economic Cooperation & Development, European Community, Japanese Ministry of International Trade & Industry, Bureau of the Census

Chemicals continue to be the trade category with the largest surplus

$ Billions	U.S. exports				U.S. imports			
	1993[a]	1992	1991	1990	1993[a]	1992	1991	1990
Machinery & transport equipment	$205.2	$200.9	$187.4	$172.5	$254.1	$232.0	$210.8	$208.0
Miscellaneous manufactures	49.8	48.0	43.2	39.3	102.4	95.0	83.4	81.5
Chemicals	44.9	44.0	43.0	39.0	29.2	27.7	24.2	22.5
Manufactured goods classified by material	36.6	36.3	35.6	31.7	65.5	60.4	57.4	59.9
Food & live animals	32.0	32.9	29.6	29.3	23.0	22.6	22.0	21.9
Crude materials, inedible except fuels	24.7	25.4	25.5	27.0	15.5	14.0	13.1	14.5
Mineral fuels & lubricants	10.1	11.1	12.0	12.2	58.2	55.0	54.3	64.5
Beverages & tobacco	6.4	7.1	6.8	7.1	5.8	5.4	4.8	4.6
Animal and vegetable oils, fats & waxes	1.4	1.4	1.1	1.2	1.2	1.1	0.9	0.8
Other	21.0	18.3	16.8	16.2	20.1	19.3	17.2	16.8
TOTAL	$457.2[b]	$448.2[b]	$421.9[b]	$394.0[b]	$575.0	$532.5	$488.1	$495.0

a C&EN estimates. b Includes reexported imports not included in individual categories. Source: Bureau of the Census

chemical companies because Canada is the largest single-country export market for U.S. chemicals.

Exports to Latin America, another major marketing region for U.S. chemicals, also are faring well this year. In 1993 they will amount to about $7.8 billion, 7.5% higher than last year.

One reason, of course, is the booming market for U.S. chemicals in Mexico. Mexico already is the third largest country market for U.S. chemical exports. They will jump again this year, this time by more than 8% to $3.4 billion.

Chemical exports to Mexico, in fact, will have almost doubled in the past five years. This explains why the chemical industry has supported the North American Free Trade Agreement (NAFTA) and why the industry fought so hard to help push NAFTA through Congress.

Now, with the NAFTA battle won in Washington, the chemical industry's small cadre of trade advisers are turning their attention to Geneva. There, negotiators from some 110 countries are making yet another 11th-hour effort to salvage the seven-year-old Uruguay round of the General Agreement on Tariffs & Trade (GATT) multilateral trade negotiations.

The deadline for completing the negotiations is Dec. 15. At press time, it appeared that negotiators would be able to resolve the several bitterly contested issues and meet that deadline.

The chemical industry certainly hopes so. Larry R. Gess, director of world trade for Nalco Chemical, recently told the Trade Subcommittee of the House Ways & Means Committee that the Uruguay round is "the engine we need to pull us out of the economic quagmire" in which international trade is languishing.

Gess calls the potential trade benefits that could spring from a successful Uruguay round "staggering." In scope and impact, he says, a Uruguay round pact is likely to have many times the benefits of a regional trade agreement such as NAFTA.

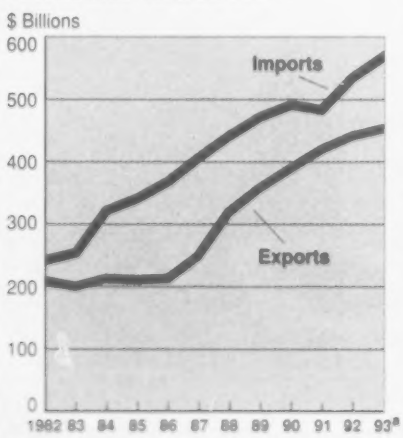
The U.S. chemical industry has long been a strong supporter of the Uruguay round. It still supports the "draft final agreement"—the so-called Dunkel text. Issued in December 1991, this text, named for Arthur Dunkel, who was then the director general of GATT, was supposed to have been the basis for concluding the negotiations.

But several countries, including the U.S., have called for serious changes in the Dunkel text. This opened up several cans of worms, some of which are still unresolved. The U.S. chemical industry's support for the Dunkel text is premised on negotiating a reasonable market access agreement that covers both tariffs and nontariff barriers. Market access is one of the major issues still being negotiated.

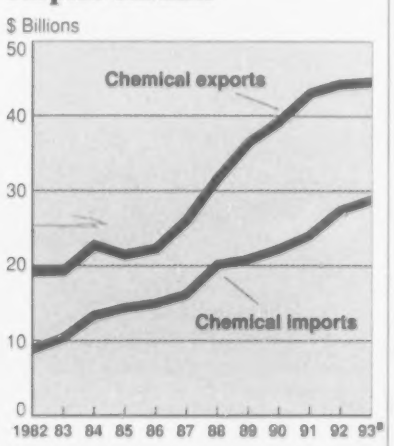
Agricultural trade has long been—and still is—a major stumbling block. Not all issues relating to services trade have been resolved. And recently, antidumping has emerged as another big issue.

Still, Peter D. Sutherland, director general of GATT, now thinks that negotiators can reach agreement by the Dec. 15 deadline. Based on indications that the U.S. may dilute its hard-line stance and compromise with France over cuts in farm subsidies, trade observers are cautiously inclined to agree. □

U.S. trade deficit continues to rise . . .

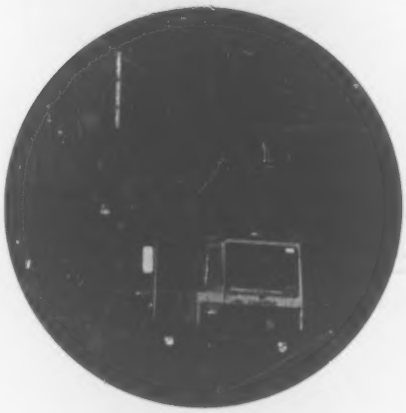


. . . while chemical trade surplus shrinks



a C&EN estimates. Source: Bureau of the Census

EUROPE



Definite Though Modest Recovery Forecast For 1994

Overcapacity and weak economies will continue to exact toll on European chemical companies

Patricia L. Layman, C&EN London

"Many chemical executives see plant shutdowns rather than growth in demand as the best cure for present excess capacity." That was the analysis of C&EN's World Outlook for the Western European chemical industry 11 years ago—in its issue of Dec. 20, 1982.

Similar problems of structural capacity, exacerbated by economic recession, face the chemical industry's executives as they come to the end of a depressing 1993. Profit-and-loss accounts for petrochemical and basic chemical producers have been liberally splashed with red ink this year, even more so than last. Chemical companies with pharmaceutical interests, which historically have provided extra buoyancy to results, have been hit by changes in government regulations. As for the outlook, the hope is that the economic recovery predicted for Western Europe in 1994 does, indeed, come to pass, to bring encouraging news back to chemicals.

Preliminary data indicate that chemicals production in Western Europe dipped 1 to 2% overall in 1993 from 1992 levels, paced by a 3% drop in production in the chemical industries of Germany, Italy, and the Netherlands, and a 5% drop in chemical output in Belgium. Of the countries with major chemical industries, only the U.K. showed any strength, with chemical production growing 3%, as the country emerged from recession; it had been one of the first countries to plunge into recession.

Now, as they ready early-year forecasts for 1994, economists throughout the Western European chemical industry are fighting their traditional optimism, predicting flat output levels or only very modest growth. A sluggish recovery throughout the region, and weak prices for chemical products, will also mark the upcoming year, the forecasts predict.

As Peter Vogtländer, chemicals coordinator at Shell International Chemical Co., put it at the Society of Chemical Industry's European annual meeting in Rome in October, fundamental structural problems are dogging the industry. "Without these fundamental problems, the solution would simply be to bring supply and demand closer into balance." But that, he said, would be a short-term fix: "If we want to achieve a sustainable improvement, we need to get to the root of the structural problem of cost competitiveness."

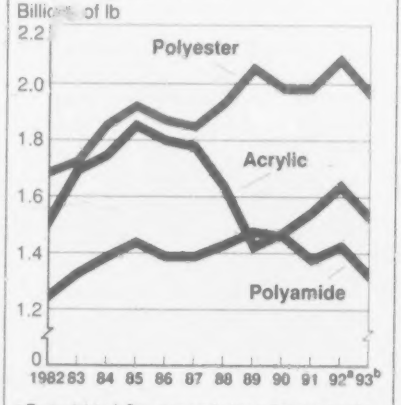
His colleague Pierre Yves Masson, head of chemicals international marketing at Shell, shares that assessment of the industry's problems. "The problems of the chemical industry are related to the economy," he says. "But the problem is not directly the economy, but the poor investment strategy of the companies, aggravated by the economy. When an industry is well managed, it can go through severe economic conditions—[as did] the oil industry, for example. The economy will only influence, it is not the main factor."

Petrochemical producers are waiting to see what the coming year will bring, in fact, in the way of restructuring—of cracker closures or manufacturing withdrawals. Probably the potentially most promising means of getting the process under way is an initiative that has been developed by the Association of Petrochemical Producers of Europe (APPE), a group under the umbrella of CEFIC, the European Chemical Industry Council, in Brussels.

Details have not been publicly revealed to date, but the initiative involves a restructuring fund to which member companies will contribute and from which grants can assist companies in closing capacity. The fund, reported to be a target amount of about around $300 million, must be agreed to unanimously, and that has proven to be a tough requirement. At APPE's meeting in November, a final-approval vote was divided, with about 80% of the members backing the plan. According to at least one corporate member, "We believe this is very encouraging, and we hope by mid-December APPE will have full approval."

If the vote goes ahead at this month's meeting, APPE can present the concept to

Man-made fiber output will sag in 1993



a Revised data. b Based on production in first nine months of 1993. **Source:** CIRFS (International Rayon & Synthetic Fibers Committee)

Major European countries have serious unemployment problems

	Number of unemployed[a] (millions)	% unemployment[a]
EUROPEAN COMMUNITY		
Italy	4.58	10.9 %
France	3.00	10.8
U.K.	2.87	11.4
Spain	2.52	21.8
Germany[b]	2.17	5.6
Belgium	0.51	9.5
Netherlands	0.38	8.1
Portugal	0.33	5.2
Denmark	0.33	10.5
Ireland	0.29	18.3
Greece	0.15	7.7[c]
Luxembourg	0.003	2.8
TOTAL	17.13	10.4 %
U.S. UNEMPLOYMENT RATE		7.0 %
JAPAN UNEMPLOYMENT RATE		2.5 %

a June 1993 data from Commission of the European Community
b Excludes eastern Germany. c Unemployment rate for 1992

the antitrust authorities in the Commission of the European Community (EC).

In a way, the proposed restructuring would mirror the restructuring of the Western European fibers industry in the 1980s. There are still problems with overcapacity in some fiber sectors, but the industry is now much healthier than it was at that time. Its problems today reflect a geographical shift in markets, as textile customers have relocated to low-wage areas in Southeast Asia, for example. And this year's European fibers output has been affected by an abrupt loss of business from Chinese buyers, with a resulting scramble for business disrupting normal import-export patterns.

For the petrochemical industry, there has been an almost built-in excuse for inaction, given the fact that, in the past, officials at the EC Commission held hard-line antitrust views. But the atmosphere in Brussels has changed, observes Simon Woolley, general manager for strategic planning at BP Chemicals. "There are EC laws you have to live with, but there is scope for interpretation. We get some feedback that officials there will be realistic [about any restructuring proposals]. Anything that has companies doing things in a collective way will need EC approval. But it is in Europe's interest to have a competitive petrochemicals industry, and I believe that European politicians understand that."

Exactly how helpful the APPE plan would be is arguable. Some industry analysts in London, for example, are convinced the plan is just the ticket for the industry. Others are less sanguine.

For example, Tony Church, a chemicals analyst in the London offices of broker Wertheim Schroder, doubts that the APPE initiative will be much help. "Pricing power will continue to be in the hands of customers," he says. "Companies will continue to suffer. How long depends on how much pain there is—they seem to want to stay in these businesses."

As he sees it, the outlook for the European chemical industry in 1994 is "bloody awful." There will be a very slight pickup in demand in the second half, he predicts. "Just a little, essentially, the start of a slow recovery. Companies with exposure to the U.S. will benefit more than others as the U.S. recovers more quickly."

The immediate problem during the past year for the industry has been low selling prices, which affect profit margins. As Shell's Masson observes, "The main problem is the selling price. We have not seen a collapse of the market: Volumes are not bad, but people are not reasonable—they want to keep market share at any price." Things are getting better, now, he says, as warehouses empty and production declines some.

In his statistical review of the European chemicals scene in October, Church noted that prices have been particularly hard hit in 1993. "After a second quarter when prices rose a little from the very depressed levels of early 1993, there were lingering hopes that these higher levels would be held in the third quarter, to be followed by further rises in the fourth quarter. The seasonal slump in August [hit hard] the third quarter and, although September started brightly enough with a number of announcements of price rises, the follow-through has been largely nonexistent," he observed. Polyvinyl chloride, he concluded, was the only polymer that had managed to climb back to a break-even point.

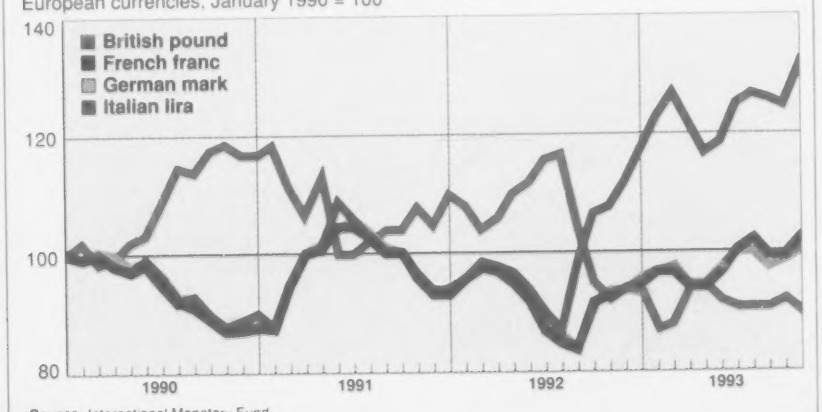
Despite his somewhat gloomy outlook, however, Church's projections into 1994 show that he expects some positive results to begin to filter through to the major chemical producers. Tables showing year-on-year changes from 1991 to 1992, and 1992 to estimated 1993 results, for example, are littered with minus signs, with widespread drops in sales, operating profits, and pretax profits. His projections for the major chemical producers for 1994, however, show mostly positive rates of growth.

For the European chemical industry, the past year's shocker has been the state of the German economy, and the consequent effects on its chemical industry, by far the largest in Europe.

According to Wolfgang Hilger, chairman of Hoechst, sales volumes for Hoechst in the first three quarters of the year in Germany were well below the previous year's level, and that softness in demand led to further price reduc-

Dollar stabilized and strengthened in 1993

Relative value of U.S. dollar versus four Western European currencies, January 1990 = 100



Source: International Monetary Fund

tions. This meant that, for Hoechst, "particularly in our plastics, fibers, chemicals, and synthetic resins and paints activities, we had to cope with appreciable declines in sales."

"Sending out the right signals this year is a task that lies in the hands of our politicians and of course the representatives of both sides of industry. It is of utmost significance not only to the existence of the chemical industry but also to a number of other industrial sectors in eastern and western Germany," he contended—developing at his Hoechst autumn press briefing a theme he has also stressed during his two-year stint as head of the German Chemical Industry Federation. That stint is now drawing to a close.

Jürgen Strube, chairman of BASF, cited German government health care reforms that came into effect at the beginning of 1993 as one of the major factors that affected the country's pharmaceutical industry during the year. The original plan was to trim 3 billion deutsch marks—roughly $1.8 billion—by curtailing physicians' prescriptions for drugs, which are paid by the government. So successful was the plan that it will have saved 7 billion marks, as physicians switch from prescribing patent-protected drugs to generics. That is good for the government, which is trying desperately to cut its own spending. The long-term implications for pharmaceuticals R&D, however, are not clear.

Given the combined forces of reduced pharmaceuticals sales, lower petrochemical prices, and lower demand as a result of the German recession, German chemical companies have begun tackling some of the same problems their counterparts in the U.S. and the U.K. grappled with earlier. They have begun pruning their product portfolios, carefully, in small bits and pieces, during the past year. And they have finally begun trimming employment.

For example, at Bayer, group personnel expenses were down 3% for the first nine months, and those at parent company Bayer A.G. were down by more than 8% from the comparable period last year. There was no possibility for creating additional jobs in the near future, however desirable this would be from an economic and social viewpoint (given the high level of unemployment in Germany), says Manfred Schneider, Bayer chairman.

Calculated for both the western and eastern parts of the country, unemployment is currently running at 3.5 million. And that figure is expected to rise to 4 million next year.

Germany's 4 million will put it in the same league as Italy, which leads in total unemployed among the EC countries. Italy's total is rising inexorably, as government-owned companies, historically used as vehicles for patronage jobs, prepare themselves for privatization.

Meanwhile, pangs of unemployment are sharp throughout Europe. The October figures for France, for example, show joblessness of 12%, up from 11.8% in September; the total was about 3.3 million French citizens registered with the national agency for employment. And in Finland, unemployment in September 1993 was 19.2%, or 490,000 people unemployed.

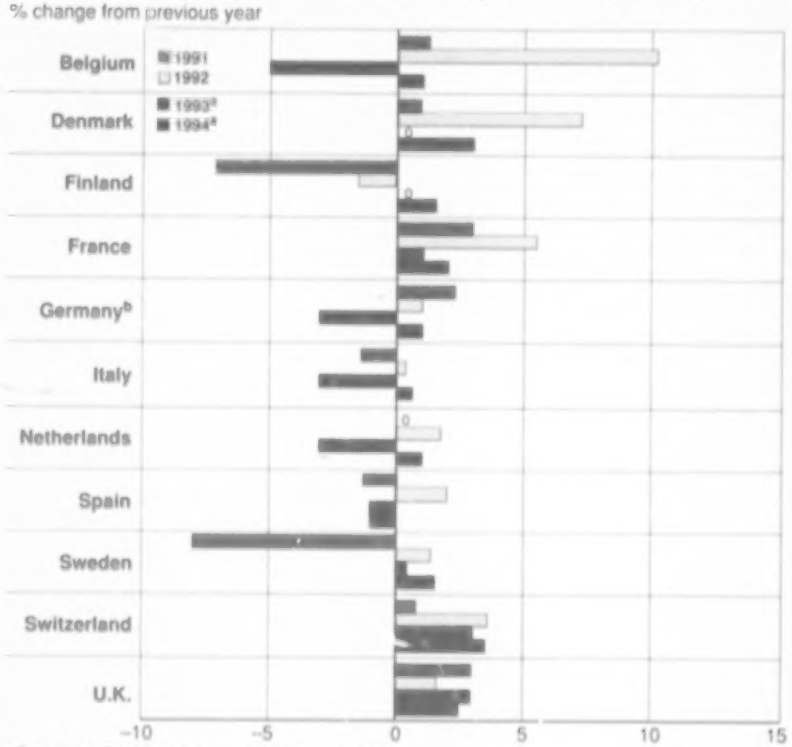
In fact, the nearly 18 million unemployed people in Western Europe could form a country that would be the sixth largest in the EC, after Spain's 40 million population, and larger than the Netherlands' 15 million.

Things are not expected to become markedly better as long as Germany—the country which had been looked to as the engine pulling the European economy along with it—is in recession. And experts are divided as to when that will end.

A report published in October from Germany's six leading economic institutes predicted that the German economy will grow 1 to 1.5% next year; this past year, it shrank about the same amount.

On the other hand, Germany's council of economic advisers issued its annual report in November, predicting zero growth and rising unemployment in the western part of the country in 1994. Reasons for the stagnation: declining exports and a loss of confidence

Chemical output projected to pick up modestly next year



a Estimates. b Does not include former East German states.
Sources: European Chemical Industry Federation, C&EN estimates

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by the business community in the German economy, resulting in a sharp drop in investment.

Confirming that lack of confidence, BASF's Strube noted: "We do not share the optimism expressed in the autumn report of the German economic institutes on growth in 1994. Although volumes and sales revenue are beginning to stabilize slowly at a low level, it is too early yet to talk about the light at the end of the tunnel—there is a glimmer of hope, perhaps, at best.

"We in Germany expect no more than a minimum increase, in real terms, in the gross domestic product for 1994. In Western Europe, we believe that an increase of less than 1% is a possibility. There is unlikely to be significant growth in Germany and Western Europe before 1995."

Nevertheless, even if the German institutes' forecasts come true, the EC's economy is not expected to expand enough to put many of the community's unemployed back to work. That will mean a continuing draw on countries' purse strings for funding programs of health, social security, and unemployment payments, as well as new initiatives on education and retraining.

The emphasis for the EC, says a draft of the community's policy document on competitiveness, growth, and employment—which sets a target of halving unemployment to 5% by 2000—must be on "trading up" into higher value-added, better quality goods and services, rather than downgrading social protection and welfare provisions. But in a sense, that conflicts with the need seen by Europe's various industries to reduce costs to ensure competitiveness.

"It will be a long time before we in European industry can be competitive again," frets one chemical industry manager. "Look at our wage costs or social costs. That is stopping us, and it will stop our customers, such as the car industry.

"If Thailand is becoming too expensive, and people want to go to Vietnam," he adds, "it indicates the degree of uncompetitiveness we have in Europe. Until this is corrected by productivity gains, we will continue to suffer. The EC is losing its grip on what is going on in European countries."

For the coming year, companies agree that joint ventures will become increasingly important. No matter what happens to the APPE restructuring fund, joint ventures are one way to tackle the industry's—companies'—problems.

This past year, for example, has seen the merger of petrochemical and polyolefin operations of Finland's Neste and Norway's Statoil. Shell and Montedison are discussing a joint venture in polyolefins. And swaps of operations are increasingly seen as another way to trim the large number of producers in the European chemical industry.

As one manager involved in joint-venture discussions puts it, "The problem in the industry is too many players, with too many small plants, not well located strategically." In a venture or alliance, by contrast, each company doesn't feel obliged to have its own plant, so decisions can be made to concentrate on those that are most strategically located.

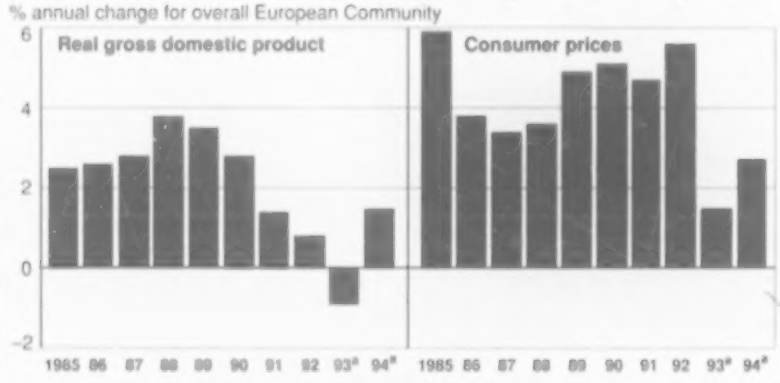
Sometimes it's a matter of corporate philosophy, points out BP Chemicals' Woolley. For example, "BP Chemicals is historically a joint-venture company—we started with a venture between British Petroleum and Distillers. We don't have a strategy that says we want to do it on our own."

In fact, he adds, "opportunities absolutely abound for ventures, like the recycling consortium [to recycle plastics waste into olefin feedstocks]. You don't just do one or two or a dozen, and say you are finished. There will always be some coming along. Internationally, it is the essential way to do it—work with partners."

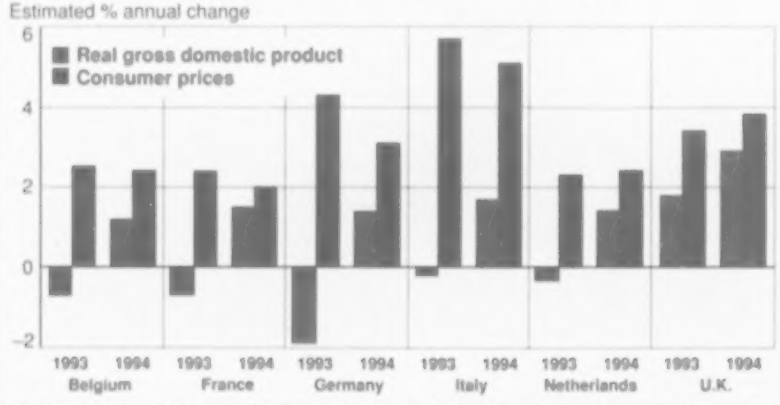
And, of course, underlying all the industry's other activities will be the attention it must pay to public concern about environment and corporate responsibility. Not just a flashy one-year program, this is part of the plugging-away effort to which the industry has committed itself, via Responsible Care programs and environmental reports, throughout Europe.

As Woolley puts it, "The issue of public trust remains crucial. It remains as an issue. Public perception of chemicals is pretty low, compared with what the industry is genuinely doing for society and the public. The industry still needs to get its message across." □

Flat European economies will begin to pick up next year . . .



. . . as individual countries survive troubled 1993



a Estimates. **Sources:** Commission of the European Community, Organization for Economic Cooperation & Development

JAPAN

Earl V. Anderson,
C&EN Northeast News Bureau

Once Booming Economy Struggles Through Tough Times

Severe recession continues and recovery probably won't start soon

Japanese chemical companies are trying every trick in the book to weather the country's severe and persistent recession. They are cutting back production, closing plants, and delaying projects that are on the drawing boards. They are joining in cooperative production and marketing arrangements.

Some companies are starting the painful restructuring process that many U.S. chemical companies have already gone through over the past few years. Some are trying to augment their weak domestic sales with exports, which is not an easy task in the face of strong international competition and a strong yen. Some are even suspending dividends—anything to stem the flow of red ink that has become commonplace in the Japanese chemical industry.

These actions may help keep the performance of Japanese chemical companies from getting worse than it already is. But they aren't helping it to get better. Chemical companies in Japan, particularly those that depend heavily upon their basic petrochemical businesses, are taking a drubbing.

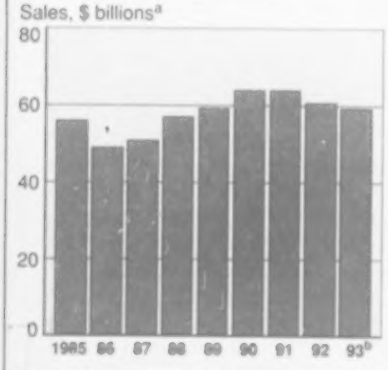
Early C&EN estimates of combined sales and income for 12 of Japan's leading chemical companies indicate that, although chemical industry sales will probably drop, profits may rise almost 5% during this fiscal year, which ends next March. The estimates are based on data compiled by Toyo Keizai, the financial publishing house, in its Japan Company Handbook.

Toyo Keizai's data and C&EN's early estimates may be much too optimistic, however. Recent company reports reveal that the bloodletting may be much more severe than early estimates indicate.

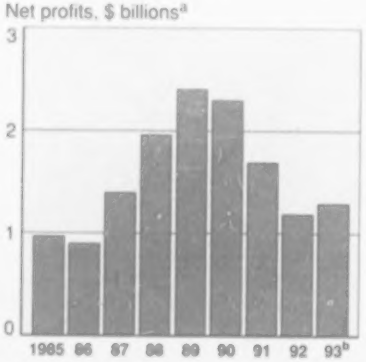
Faced with sluggish demand for synthetic fibers and resins, Kuraray expects its fiscal 1993 sales to be 2% lower than last year and has lowered its profit estimate by about 10%. Teijin anticipates its pretax profits falling a hefty 34% for the year, which would bring them in well below earlier forecasts. With sales through the first half of the year off by 9%, Teijin's major problem is weak demand in the textile arena.

Japanese petrochemical giant Mitsubishi Kasei thinks that its sales won't decline this fiscal year. But it can't say the same about profits. It expects to lose almost $19 million this year, the company's first loss since its stock was listed on the Tokyo Stock Exchange in 1950.

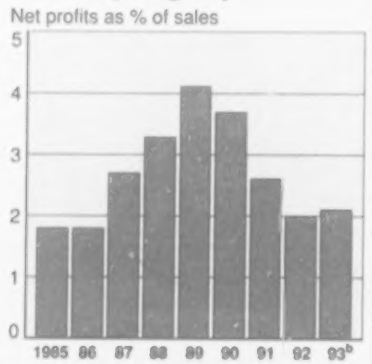
Sales decline for chemical companies . . .



. . . net profits barely budge . . .

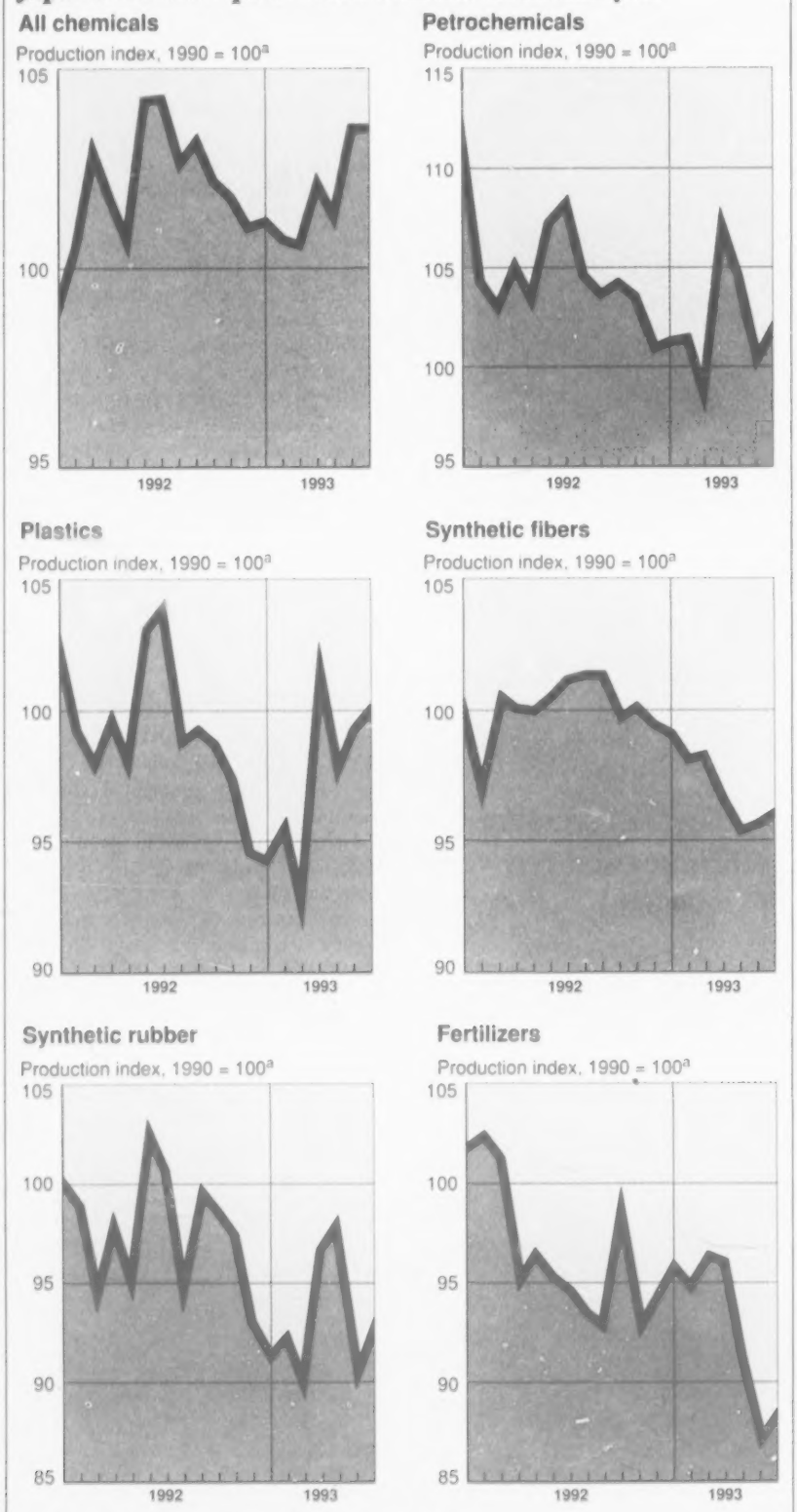


. . . and profit margins rise only slightly



Note: Based on the results of 12 leading Japanese chemical companies: Asahi Chemical Industry, Dainippon Ink & Chemicals, Hitachi Chemical, Mitsubishi Kasei, Mitsubishi Petrochemicals, Mitsui Toatsu Chemicals, Sekisui Chemical, Showa Denko, Sumitomo Chemical, Takeda Chemical Industries, Teijin, and Toray Industries. The fiscal year for most, but not all, of these Japanese companies ends March 31 of the following year. **a** Converted at recent exchange rate $1.00 = 106.69 yen. **b** C&EN estimates. **Source:** Toyo Keizai

Japan's chemical production remains weak this year



a Seasonally adjusted. **Source:** Ministry of International Trade & Industry

At many major Japanese chemical companies, the story is the same. Weak demand is keeping a lid on sales. And low prices are driving profits down.

And it may be later, rather than sooner, before the economic tide turns. Japan's economy has been stuck in a recession for more than two years. Japan's Economic Planning Agency determined that the recession started in April 1991. And economists now expect the recession to linger longer than they originally thought.

Recent trends indicate that production will decline further before it starts rising, that consumption and capital spending will drop further, and that the employment outlook will worsen.

Earlier in the year, conventional thinking held that Japan's economy would bottom out toward the end of this fiscal year. Now the target is the fiscal year ending March 1995, with the consensus being that recovery, if it comes, will come in the latter part of that year. Some private-sector economists even believe that the economy may not hit bottom until even the following fiscal year.

Chemical industry executives in Japan certainly hope that relief comes sooner rather than later. They want to see more product flowing out of their plants, something that won't happen unless demand perks up.

If April 1991 was, indeed, the turning point for the Japanese economy, the all-chemical production index for a recent month was up a scant 1% over the April 1991 index. That's a pittance in more than two years.

And not all sectors of the industry were even able to share in that small gain. Over the same time span, the production index for petrochemicals is down 4.9%, while the index for plastics is down 2.6% and that for synthetic fibers is down a hefty 6.3%.

Very few chemicals will make it through 1993 with a larger output than they had in 1992. Production of ethylene, a bellwether chemical and cornerstone of Japan's important petrochemical industry, will fall 5.5% this year to about 5.8 million metric tons. In September, the latest month for which statistics are available, ethylene production was just under 436,000 metric tons. That's the lowest monthly output since 1989 and it knocked Japan's ethylene plant operating rate below 80%.

Ethylene's problems reflect the weak demand that its derivatives are facing

in the domestic market and, to a lesser extent, in the export market. Output of polyethylene, for instance, probably will be about 7% lower this year than it was in 1992. Ethylene demand for ethylene oxide and glycol is off, and polystyrene output will be lower this year. Among ethylene's major derivatives, only polyvinyl chloride may be up—and this by only a minuscule 0.2%.

The picture isn't any brighter in Japan's chemical export business. Exports of the major polyolefins—low- and high-density polyethylene and polypropylene—were off about 10% during the first half of the year. Producers expect the export slump to continue for some time. Diminished demand, lower prices, and the strong yen are all contributing to the poor export performance.

The yen, in particular, is a big problem for all Japanese exporters. Typically, if a country's currency is weak, its companies tend to be more competitive in international markets. Strong currencies make them less competitive.

This year, the yen has become very strong. It started the year at about 125 yen to the dollar, then strengthened to almost 100 yen to the dollar before bouncing back to the 106- to 108-yen range.

Not only does this phenomenon make Japanese exports less competitive, it also makes Japanese export statistics more confusing. Japan's Ministry of International Trade & Industry (MITI) reports exports and imports in both yen and dollars. On a dollar basis, Japan's chemical exports will rise 5% and imports will grow 3.7% this year.

But on a yen basis, MITI data indicate that Japan's chemical exports will drop 6.2% and imports 6.4%. The yen-based data are closer to the truth. Additionally, although C&EN reports its data on Japanese chemical trade in dollars, it reflects MITI's yen data because data for all years are converted at the same (recent) exchange rate.

The immediate future of Japan's chemical industry, however, is much less confusing. Until Japan's economy recovers, its chemical companies must continue to find ways to cope with hard times and keep their losses to a minimum. □

Production of most chemicals will dip

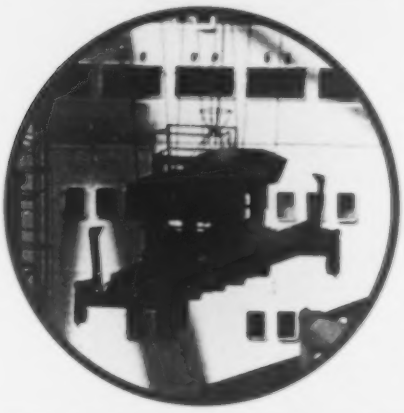
Thousands of metric tons, unless otherwise indicated	Production					% change
	1993[a]	1992	1991	1990	1989	1992–93
INORGANIC CHEMICALS						
Ammonia	1,700	1,788	1,855	1,831	1,831	–4.9%
Ammonium chloride	230	233	239	246	274	–1.3
Ammonium sulfate	1,700	1,830	1,781	1,803	1,717	–7.1
Calcium carbide	260	270	303	294	344	–3.7
Calcium superphosphate	405	396	420	472	454	2.3
Carbon black	705	771	793	783	779	–8.6
Chlorine, liquid	925	978	1,027	1,042	1,009	–5.4
Hydrochloric acid	680	706	702	637	571	–3.7
Nitrogen[b]	8,865	9,129	8,767	8,299	7,856	–2.9
Oxygen[b]	8,040	8,067	9,000	8,787	8,384	–0.3
Sodium carbonate	1,040	1,057	1,104	1,135	1,105	–1.6
Sodium hydroxide	3,760	3,866	3,905	3,917	3,674	–2.7
Sodium silicate	715	722	787	788	756	–1.0
Sulfuric acid	6,865	7,100	7,057	6,887	6,885	–3.3
Titanium dioxide	245	252	279	280	275	–2.8
ORGANIC CHEMICALS						
Acetaldehyde	345	391	384	384	356	–11.8
Acetic acid	475	451	458	462	432	5.3
Acetone	340	377	369	334	337	–9.8
Acrylonitrile	600	621	604	593	611	–3.4
Benzene[c]	3,150	3,309	3,050	2,768	2,672	–4.8
Butadiene	815	851	847	827	827	–4.2
Butanol	380	371	334	300	291	2.4
Caprolactam	515	548	531	509	469	–6.0
Cyclohexane	625	632	584	629	656	–1.1
Dioctyl phthalate	270	297	305	295	293	–9.1
Ethylene	5,770	6,104	6,142	5,810	5,602	–5.5
Ethylene dichloride	2,690	2,708	2,642	2,660	2,464	–0.7
Ethylene glycol	530	560	609	501	548	–5.4
Ethylene oxide	675	721	760	674	681	–6.4
Methanol	75	34	77	84	82	120.6
Octanol	310	327	295	283	285	–5.2
Phenol	530	538	495	403	423	–1.5
Phthalic anhydride[c]	150	165	162	161	160	–9.1
Propylene	4,270	4,536	4,431	4,215	4,036	–5.9
Propylene glycol	285	302	301	298	285	–5.6
Styrene	2,190	2,182	2,227	2,161	1,990	0.4
Terephthalic acid	1,565	1,425	1,434	1,338	1,200	9.8
Toluene	1,150	1,150	1,119	1,078	1,075	0
Toluene diisocyanate	140	132	136	116	104	6.1
Urea	725	725	730	776	810	0
Xylene	3,230	3,203	2,918	2,652	2,488	0.8
PLASTICS						
Phenolic resins	325	356	383	385	375	–8.7
Polyethylene	2,775	2,980	2,982	2,888	2,712	–6.9
Polypropylene	1,915	2,038	1,963	1,942	1,719	–6.0
Polystyrene	1,985	2,005	2,121	2,097	1,997	–1.0
Polyvinyl chloride	1,985	1,981	2,055	2,049	1,972	0.2
SYNTHETIC RUBBER	1,330	1,388	1,377	1,426	1,352	–4.2

a C&EN estimates. b Millions of cubic meters. c Petroleum-based product only.
Source: Ministry of International Trade & Industry

Japan's chemical exports, imports both decline

Foreign trade in chemicals, $ billions[a]

a All data converted at recent exchange rate of $1.00 = 106.69 yen. b C&EN estimates.
Source: Ministry of International Trade & Industry



Exports Provide Boost For Chemical Firms

Particularly to the U.S., exports get the credit for improved sales and earnings despite sluggish economy

Earl V. Anderson,
C&EN Northeast News Bureau

Leaders in Canada's chemical industry will be watching closely on New Year's Day to see if the North American Free Trade Agreement (NAFTA) goes into effect as scheduled and if Canada is a part of it. They certainly hope so.

The reason is simple. Many Canadian chemical companies, particularly those in the petrochemical industry, have world-scale plants, but only a small-scale domestic market of some 27 million people. To survive, these companies must export. And more and more of their exports are heading into the U.S., where the market is about 10 times larger. This year, about 78% of Canada's chemical exports will go to the U.S., up from 67% in 1985 and from only 56% in 1980.

That's a big chunk of chemical business to protect. By being a part of NAFTA, Canada will be better positioned to do just that.

Canada, of course, has had a free trade agreement with the U.S. since Jan. 1, 1989. This Canada-U.S. Free Trade Agreement (FTA) was—and still is—controversial in Canada, just as NAFTA is.

But despite the naysayers, who claim that FTA, and not the recession, has caused massive job losses in Canada, the free trade pact has provided Canada's chemical industry with such benefits as preferential tariffs and, generally, better and more secure access to its critically important U.S. market.

The Canadian chemical industry has supported a Canadian role in NAFTA from the beginning. It feared that a NAFTA without Canada could potentially erode the market access benefits that it has achieved from the earlier bilateral agreement. And the industry wants to make certain that its marketing muscle in the U.S. isn't atrophied by a surge of new chemical competition from Mexico entering the U.S. on better terms than those already enjoyed by Canadian chemicals.

The Canadian Parliament approved NAFTA in May, but it still had to be officially proclaimed by the Prime Minister. Jean Chrétien, who now holds that position, wanted to make some changes in NAFTA involving energy, antidumping, and subsidy provisions.

But since the Liberal Party's overwhelming victory in Canada's October elections and NAFTA's victory in Congress, Chrétien has mellowed from his campaign rhetoric. Some, but not all, of the changes he wanted have been made. And he has approved the pact. Canada's trade minister, Roy MacLaren, says there's no need to delay implementing NAFTA on Jan. 1.

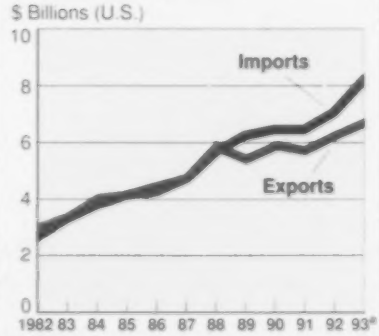
That should please Canada's chemical industry. Any improvement in its sales and profits next year will depend heavily on exports, particularly to the U.S. DuPont Canada's third-quarter results indicate just how heavily some Canadian chemical companies depend on exports. Although third-quarter sales increased almost 13% from last year to $283 million in U.S. dollars, domestic sales increased only 5%. Exports, meanwhile, were up 24% over the same period last year and continued to be the largest contributor to DuPont Canada's sales growth. In fact, exports accounted for 64% of the company's third-quarter product revenue.

Indeed, Canada's chemical exports are booming this year. By year's end, they likely will hit $6.8 billion in U.S. dollars, more than 10% ahead of last year. One reason for this export performance is the weaker Canadian dollar. Weak currencies tend to make a country's exports more competitive on international markets—and vice versa.

As fast as chemical exports are rising, however, Canada's chemical imports are growing even faster. They probably will rise almost 20% this year to $8.4 billion in U.S. dollars, saddling the country with a $1.6 billion chemical trade deficit. Three quarters of those imports originate in the U.S.

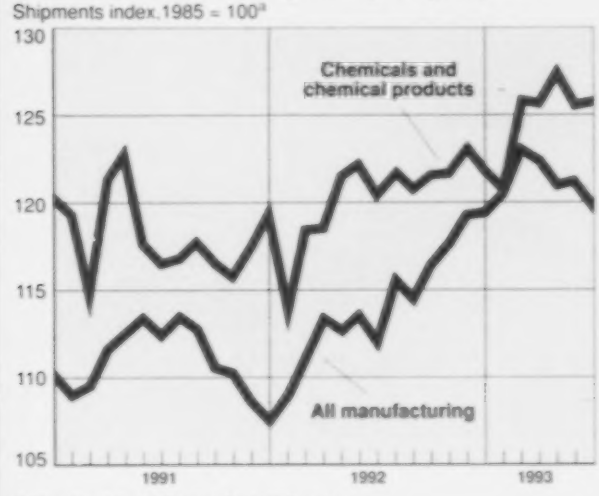
Nevertheless, exports have been an elixir this year for Canada's chemical industry. They are a big reason why some chemicals, particularly petrochemicals, will enjoy some gains in

Canada's chemical imports outpace exports

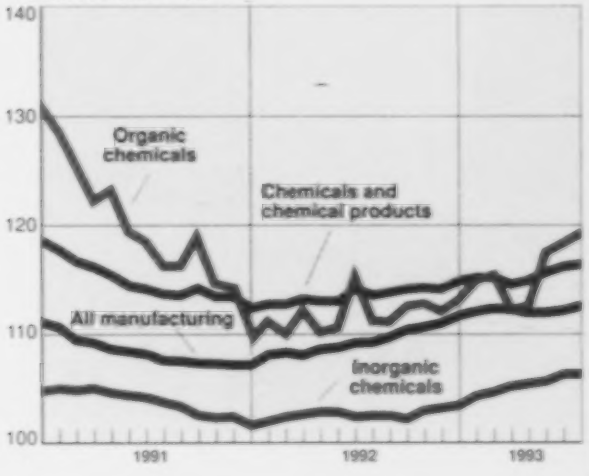


Note: All data converted at recent exchange rate of $1.00 U.S. = $1.3198 Canadian. a C&EN estimates
Source: Statistics Canada

Chemical shipments pick up slightly . . .



. . . and chemical prices start to firm



a Seasonally adjusted **Source:** Statistics Canada

production, however small those gains may be. And they are why the output of other petrochemicals is not much lower.

Ethylene production, for instance, will be down only 0.2% this year. Output of two of its major derivatives, low-density and high-density polyethylene, will be down 0.6% and 2.0%, respectively. Their production would have been down even more were it not for exports.

And exports, along with cost-cutting measures, are the reason that third-quarter sales and earnings improved for most of Canada's major chemical companies, despite a still-sluggish domestic economy. Profits likely will continue to increase gradually during the fourth quarter as well.

According to one seasoned observer of the Canadian chemical industry, exports will help sales and profits improve even more next year. He believes that, with any kind of a pickup in the U.S. economy, excess capacity in the U.S. will be largely eliminated and the door opened for more imports from Canada. Not many foreign petrochemical companies can compete in the U.S. market with Canadian companies in Alberta.

An old cliché says that when the U.S. catches cold, Canada catches pneumonia. Reversing that thought, this observer thinks that, with any kind of an economic recovery in the U.S., "we (Canadian petrochemical producers) will be absolutely bloody booming."

That probably is an exaggeration, but there's no doubt that any U.S. economic recovery will be reflected in Canada's chemical fortunes. NAFTA may also help in a convoluted sort of way.

Canadian chemical producers don't expect their small chemical exports to Mexico to increase much for a long time. If NAFTA spurs the Mexican economy as it is supposed to, most of the increased Mexican demand for petrochemicals will be supplied from the U.S. Gulf Coast. However, Canadian chemical producers think that this will make less U.S. material available for the U.S. market and give them an opportunity to increase their exports to markets along the northern U.S. tier.

Certainly, Canadian chemical companies cannot expect much improvement in sales and earnings next year unless exports have another banner year. Canada's own economy has been recovering, but very slowly. Some industrial sectors, such as pulp and paper, construction, and mining, are still struggling. All are major markets for chemicals. □

Output is down for most major chemicals

Thousands of metric tons	Production 1993[a]	1992	1991	1990	1989	% change 1992-93
Ammonia	4,100	3,770	3,669	3,715	4,054	8.8%
Ammonium nitrate	985	1,015	963	1,031	1,056	-3.0
Benzene	675	686	712	762	670	-1.6
Chlorine	1,200	1,364	1,402	1,542	1,592	-12.0
Ethylene	2,515	2,521	2,425	2,434	2,317	-0.2
Hydrochloric acid, 100%	135	168	193	187	180	-19.6
Nitric acid	885	919	912	965	1,027	-3.7
Polyethylene, high density	635	648	458	364	303	-2.0
Polyethylene, low density	1,000	1,006	1,109	1,167	1,039	-0.6
Polystyrene	160	167	167	215	196	-4.2
Propylene	775	753	717	765	719	2.9
Sodium chlorate	770	633	695	659	593	21.6
Sodium hydroxide	1,270	1,428	1,498	1,650	1,679	-11.1
Sulfuric acid	3,515	3,225	2,953	3,311	3,560	9.0
Toluene	320	372	364	425	397	-14.0
Urea	3,015	2,550	2,397	2,490	2,402	18.2
Xylenes	265	339	391	514	432	-21.8

a C&EN estimates **Source:** Statistics Canada